REMARKS

I. Introduction

In response to the pending Office Action, Applicants have amended claim 108 in order to further clarify the subject matter of the present invention. Support for the amendment to claim 108 may be found, for example, on page 66, lines 8-12 of the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art.

II. The Rejection Of Claims 107-108 Under 35 U.S.C. § 102

Claim 107 was rejected under 35 U.S.C. § 102(b) as being anticipated by Fuller et al. (USP No. 6,068,941) and claim 108 was rejected under 35 U.S.C. § 102(b) as being anticipated by Dine et al. (US 2002/0098393) and Ueno et al. (US 2001/0001287). Applicants respectfully traverse these rejections for at least the following reasons.

With regard to the present invention, claim 107 recites a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation ***by supplying a hydrocarbon gas to the cathode*** to decrease a voltage of the cathode, after terminating operation of the fuel cell.

In contrast to the present invention, Fuller teaches a fuel cell having methanol or ethanol fed into the coolant passages during shutdown thereby supplying a hydrocarbon gas to the

cathode. It was alleged that methanol or ethanol is a hydrocarbon based material. However, this is incorrect. Hydrocarbons are organic compounds consisting exclusively of the elements hydrogen and carbon (see, page 612, Hawley's Condensed Chemical Dictionary, 12th Ed.). In contrast, alcohols such as methanol and ethanol have a hydroxyl group which contains oxygen in addition to hydrogen and carbon. Therefore, methanol and ethanol are not hydrocarbons.

Furthermore, claim 107 recites "supplying a hydrocarbon *gas* to the cathode". Methanol and ethanol, while volatile, are both liquids at room temperature. In addition, Fuller teaches that the alcohol is supplied to the cathode in an *aqueous* mixture, not as a gas. Accordingly, it is clear that Fuller does not teach a step of supplying a ***hydrocarbon gas*** to the cathode.

Amended claim 108 recites a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation by supplying water to the cathode to decrease a potential of the cathode to + 0.1 V to + 0.4 V with respect to a potential of the anode, after terminating operation of the fuel cell.

The significance of this decrease in a potential of the cathode is that it results in an advantage that the deterioration due to oxidation of the catalyst and adsorption of contaminants can be resolved (see, page 25, lines 3-6 of the specification).

In contrast to the present invention, Ueno fails to disclose the degree to which the potential of the cathode is decreased after shutting down fuel cell operation. Nor does Ueno appear to disclose the advantage of the range of decrease of potential. Accordingly, Ueno fails to

disclose a step of carrying out a restoring operation by supplying water to the cathode to decrease a potential of the cathode to + 0.1 V to + 0.4 V with respect to a potential of the anode, after terminating operation of the fuel cell.

Turning to Dine, Dine does not disclose supplying water to the cathode. Rather, Dine discloses supplying hydrogen and oxygen to the cathode. As the hydrogen and oxygen do not become water until after the gases have been supplied to the cathode and have reacted on the catalyst, it cannot be said that water is supplied *to* the cathode. Thus, Dine fails to teach a step of carrying out a restoring operation by supplying water ***to the cathode***.

Furthermore, it is alleged that Dine discloses a procedure for shutting down an operating fuel cell system in which, upon an uncontrolled shut-down, some of the residual hydrogen and some of the oxygen react on the catalyst to form water, thus implying that the cathode receives water after terminating operation of the fuel cell. However, Dine recites in the Abstract that "the fuel flow is then stopped, but the anode exhaust continues to be circulated in the recycle loop to bring the hydrogen therein into contact with a catalyst in the presence of oxygen to convert the hydrogen to water. The recirculation is continued until substantially all the hydrogen is removed. *The cell may then be completely shut down*." Thus, Dine discloses that the shut down of the cell (i.e., the termination of operation of the fuel cell) is not finished until the hydrogen and oxygen is supplied to the cathode. Accordingly, Dine does not disclose the step of carrying out a restoration operation by supplying water to the cathode *after terminating operation of the fuel cell*. As such, Dine fails to disclose the above cited limitations of claim 108.

As anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference,

Kalman v. Kimberly-Clark Corp., 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Ueno, Fuller and Dine do not disclose a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation by supplying a hydrocarbon gas or water to the cathode to decrease a potential of the cathode to + 0.1 V to +0.4 V with respect to a potential of the anode, after terminating operation of the fuel cell, it is clear that Ueno, Fuller and Dine do not anticipate claims 107 and 108 of the present invention.

III. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Date: May 23, 2007